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ABSTRACT

"Of Mice and Men" is developed as an interdisciplinary unit to be team taught by math, science, language arts, and social studies teachers and team guidance counselors. Developed as an individualized program for middle school students, a variety of supplementary materials is provided to exemplify the types of activities suggested for students. Students explore the nature of learning and the nature of intelligence through observation, care, and testing of mice. Building mazes and running tests are major activities of the unit along with intensive observation and recording of learning patterns of mice. Each unit contains an introduction, learning objectives, and activity directions. (Author/JR)

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Interdisciplinary Unit

OF MICE AND MEN

Beck Middle School

Cherry Hill, N.J.

PREFACE

The attached materials have been developed by numerous members of the Beck Middle School staff. As with all our units, this example of an interdisciplinary unit is continuously being improved. It is not, and never will be, finalized.

We have not included all supplementary materials utilized with students. However, a selection of the supplementary materials is included to provide enough examples of the types of activities provided for students.

Curriculum development for this unit was planned and coordinated by Richard D. Levy, Instructional Consultant.

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NOTES ON INTERDISCIPLINARY UNITS*

I. INTRODUCTION

The Beck staff is committed to providing our students with an individualized, interdisciplinary program. We have found that to individualize a program requires many strategies utilized simultaneously. We have also discovered two important things about interdisciplinary units. First, there must be a balance between the amount of time students are involved in an interdisciplinary unit and the amount of time they are involved in a disciplined centered unit. Second, students need to be taught how to learn from an interdisciplinary unit.

"Of Mice and Men" was developed as an interdisciplinary unit to be team taught by math, science, language arts, social studies teachers and team guidance counselor. The interdisciplinary unit itself and supplemental materials are written to be given to each student. They are not designed as a curriculum guide. The teacher's role is to utilize these materials in facilitating student learning.

II. EXPLANATION OF THE UNIT

A. Written Introduction

The purpose of the written introduction is to arouse student interest in the unit. There are many techniques to do this, such as using quotes as in this unit. Other techniques we utilize at Beck include case studies, provocative statements, questionnaire of attitudes, simulations and the like.

B. Learning Objectives

In this section of the unit we list what students are expected to be able to do. To keep a distinction between the activities and learning objectives, the learning objectives are written at a more general level of specificity than traditional "behavioral objectives." We believe that this level of specificity is more appropriate since it allows us to: (1) design multiple activities for each objective and (2) plan one activity for more than one objective. Furthermore, such objectives help us to individualize since they are written in such a way that each student can accomplish them at his/her own level of ability. The last learning objective usually deals with self-evaluation since we feel that self-evaluation is important enough to be a learning objective itself.

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C. Major Group Project

This section is designed to serve as the organizing element, or core of the interdisciplinary unit. It is the major group project that ties the program together.

We do not spell out all activities in detail in this section to avoid overwhelming students. However, to keep the continuity of the interdisciplinary unit clear, references to specific supplementary materials to be used are listed. The supplementary material is given to students at the appropriate time during the interdisciplinary unit.

Some further comments about the major group project will clarify its implementation.

1. Coordinating the Project - One of the team teachers, or team leader if designated, should coordinate the project. This person must make sure the necessary equipment is available, materials are reproduced and distributed, each team member knows his/her responsibilities, etc.

2. Grouping Students - To group students for this program teachers usually assign the groups keeping a balance between boys and girls, leaders and followers. The groups tend to function best this way, especially if the unit is used in the beginning of the school year. Groups usually consist of four students. We have, however, allowed students to select their own groups and this too has been successful.

3. Background Preparation - Students must be able to adequately perform a number of skills before they can start the major group project. Lessons must be provided for students if they can not: measure with a metric stick, weigh with a scale in grams, measure the volume of water, and read metric measures.

4. Maze Construction - This is designed as the first specific task for the group. It allows teachers to observe how each group functions and solve their problems. It also provides practice in accurate measuring.

5. Care of Mice - We start with mice under three weeks old in order to measure growth. It takes students a few days to feel comfortable with mice. Be sure water bottles function properly and watch room temperature, especially at night and over weekends. We use space heaters to keep the room warm. To eliminate most odors, we use only female mice. Have vitamins available for sick mice. At the end of the program, students may keep their mice if they have written permission from their parents. Other mice are given to a pet shop.

6. Measuring and Weighing - To weigh a mouse, put it in a can and weigh. Then subtract the weight of the can from the total weight. String or masking tape help with the measuring. We let the students figure these techniques out themselves. Measuring water and weighing food is often inaccurate and we don't stress this in the graphing.

7. Initial Observation Exercise - To do this we section off a corner of a room with books to make an area about 3 to 4 meters square. In the area we place some food, water, bedding, a tin can, running wheel and cotton. A spot light is on the area and the room lights are off. Six mice are placed inside for 15 minutes. Students are to observe and take written notes. No talking is allowed. This is followed by a general discussion on what was and what was not observed.

8. Continuing Research

In previous editions of this interdisciplinary unit students had to design their own experiment related to learning. Suggestions were provided. In order to shorten the length of the program, we eliminated the student designed experiment and now allow individual students to continue their research in our independent study program.

D. Related Units

1. General

We do not use related units with all our interdisciplinary units. We have related units for this interdisciplinary unit for three reasons.

a. Students need to have had some background preparation in certain areas such as graphing.

b. We found that by having discipline-centered related units it helps students learn to work with material presented in an interdisciplinary way.

c. Related units which tie into an interdisciplinary unit are helpful for teachers learning how to develop and implement interdisciplinary units.

Related units also allow individual teachers to develop different facets of the interdisciplinary unit based on their strengths and what they have covered previously in class. For example: the first time "Of Mice and Men" was used there were related units titled "Communication in Writing", "Decision Making" and "Public Speaking", which are no longer included.

2. Graphing Data - This related unit is usually taught by the math teacher. Some direct lessons are given, plus the use of the activity sheets in the program. This related unit is designed to prepare students for drawing conclusions from the experiment.

3. How We Learn

This related unit is team taught by the language arts and social studies teacher with the guidance counselor. We have used many different approaches with this related unit. In the related unit here the background discussions and activities are taught by the guidance counselor. The reading of the novels and the learning stations are scheduled simultaneously. Students read in the library to lower the student-teacher ratio to about 15 to 1 for the learning station activities. Many of the activities in the learning station can be presented in other ways.

E. Calendar of Events

The calendar is used to help both teachers and students plan their time. Only the key activities are listed. We have found this technique very useful in helping students learn how to plan long term projects. It is also particularly helpful to the team teachers in carrying out everything that has to be done.

F. Supplementary Materials

There are many types of supplementary materials that can be developed for interdisciplinary units. In this one we have:

1) Related units
2) Information Sheets
3) Data Forms
4) Special Reading Materials
5) Work Sheets
6) Evaluation Forms

III. COMMENTS ON TEACHING THE UNIT

A. The unit is team taught. Since we have built into our schedule a period each day when there are approximately 60 students with four teachers, the guidance counselor and teacher aide. We use this time for the major group project. The 65 students come together in a double room with the six adults to work in their groups. The staff helps the students on the task for the day. However, the project can be carried out in a regular classroom.

B. At Beck teachers constantly plan daily and weekly schedules. Students can be grouped and scheduled in the way the team teachers deem most appropriate.

C. The related units are usually taught during regular class periods. Often the language arts and social studies teachers use a double room to teach 60 students together.

D. Evaluation is an ongoing process during the unit. It includes the use of teacher observations, evaluation forms, self-evaluations of student progress in the unit, written work, group and individual presentations and teacher-student conferences. We also evaluate each group's laboratory report and provide a test for each objective. Evaluation is based upon how well each student accomplished the learning objectives based on his/her ability.

IV. INDIVIDUALIZING

Below is a list of some of the techniques utilized to individualize this interdisciplinary unit. All these techniques are not written in the unit since many are instructional strategies.

A. Learning objectives are at a level of specificity which allows students to seek their own level.

B. Group work - students learning together and from each other.

C. Variety of activities for different abilities and interests.

D. Student choices for activities.

E. Multi-level reading materials.

F. Different readings on a common topic or theme.

G. Evaluation of each student based on individual ability.

H. Hands on activities as well as more "mental" type of activities.

I. Activities from the psycho-motor, cognitive and affective domains.

J. Use of large group and small group instruction.

K. Teacher-student "tutoring" and student-student "tutoring."

L. Use of teacher aides.

M. Use of small group instructional techniques within a regular classroom.

N. Use of reading teachers in working with individual students.

V. CONCLUSION

We believe curriculum development is a process in which interdisciplinary units must be continually revised. Each team of teachers who use this interdisciplinary unit modifies it. This way, not only do the teachers make changes they consider most appropriate for their students, but make changes which are in accord with their teaching styles. Units are viewed as a spring board. They are not designed to be exactly what is to be done by students. They give the students and teachers direction. Once they become restrictive and impede learning, they are changed.

BECK MIDDLE SCHOOL
CHERRY HILL, N. J.

Team 8

INTERDISCIPLINARY UNIT: OF MICE AND MEN

I. INTRODUCTION

A. Quotes For Thought

"How strange that people of honest feelings and sensibility, who would not take advantage of a man born without arms or legs - how such people think nothing of abusing a man born with low intelligence."

Charlie in
Flowers For Algernon

"Whatever the lesson we can learn from the highly individualistic animals, it is certainly true that Man can learn a great deal about himself by studying the behavior of his "dumb" neighbors on this planet. And he can have fun doing it."

Vance Packard

"Thus it is that my friends have made the story of my life. In a thousand ways they have turned my limitations into beautiful privileges, and enabled me to walk serene and happy in the shadow cast by my deprivation."

Helen Keller

B. Unit Organization

This is an interdisciplinary unit designed to help you explore the nature of learning. The unit is based on the content and skills in math, science, language arts and social studies. You will be working on this unit with all four of your I.U. teachers.

II. LEARNING OBJECTIVES - The student will demonstrate his/her ability to:

A. . . . perform as a group member to complete a long term project by listening to the ideas of others, verbally presenting ideas to the group, giving as well as following directions, cooperating with the other group members, making a conscientious effort to have the group work together, and accepting responsibility for his/her share of the work.

B. . . . participate in class discussions by listening to the ideas of others, verbally presenting ideas to the group, and asking questions when appropriate.

C. . . . work independently in completing assignments.

D. . . . follow the rules and directions and utilize proper laboratory techniques.

E. . . . properly care for and handle laboratory animals.

F. . . . graph, chart and analyze data related to length and weight of a mouse, the amount of food and water consumed by a mouse, and how a mouse learns to run a T-maze.

G. . . . carry out, as a member of a group, an investigation on learning using the scientific method.

H. . . . record in good paragraph form data collected from observations of the physical appearance and behavior of a mouse.

I. . . . explore and discuss selected key ideas related to how people and animals learn.

J. . . . read and discuss the short story or novel "Flowers for Algernon."

K. . . . clarify his/her ideas and feelings about various topics related to learning.

L. . . . evaluate how well he/she accomplished the above objectives.

III. MAJOR GROUP PROJECT - CONTROLLED EXPERIMENT

A. Organization

1. You will be working on one of the three specific problems or the control group during small group class time.

2. Follow all the directions below in order to complete your experiment.

3. Keep all sheets and forms in your group's folder. These folders must remain in the classroom.

B. Directions

1. The General Problem

Does sound affect how fast you learn? Should you study in complete silence? Will the playing of music help you learn? Should the music be soft mood music or hot rock? Will the constant sound of a bell effect your concentration? We are going to use mice to try and help answer the above questions.

We are going to divide into four sections. Each section will try to train its mouse to run a T-maze with a different sound condition existing in the room. Each group within the sections will record data so that we can come up with conclusions about which mice learned best.

2. The Specific Problems and Control Group

   a. Section 1 (Control Group) - Advisor: Mrs. Bolno

      With complete silence in the room, how many trials does it take a mouse to run a T-maze to the right 3 out of 5 times within 5 seconds each trial?

   b. Section 2 - Advisor: Mrs. Monroe

      With soft mood music as background in the room, how many trials does it take a mouse to run a T-maze to the right 3 out of 5 times within 5 seconds each trial?

   c. Section 3 - Advisor: Mr. Niessner

      With harsh rock music as background in the room, how many trials does it take a mouse to run a T-maze to the right 3 out of 5 times within 5 seconds each trial?

   d. Section 4 - Advisor: Mrs. Regan

      With a bell constantly ringing in the room, how many trials does it take a mouse to run a T-maze to the right 3 out of 5 times within 5 seconds each trial?

3. Gather Some Facts

   a. Read and discuss the Information Sheet - Care of Mice.

   b. Read and discuss the Information Sheet - Mice As Laboratory Animals.

   c. Complete observations of the physical and behavioral characteristics of a mouse. The observations will include:

      a) Initial Observation Exercise of the eating, drinking, recreation, grooming, sleeping, and interactions of mice.

      b) Completing the Mouse Observations Sheet.

      c) Maintaining a daily observational notebook.

4. State Your Hypothesis

   a. A hypothesis is an educated guess to what the answer will be to the question stated in the problems. To make your educated guess, complete the following in writing:

      1) Individually, write 1 possible answer to the first question below and 5 possible answers to the second question.

a) Which, if any, condition (silence, soft mood music, harsh rock, or a bell constantly ringing) in the room was best for the mice to run the maze?

b) How many trials will it take your mouse to run a T-maze to the right 3 out of 5 times within 5 seconds each trial?

2) As a group answer the two questions above.

b. Place your answers in your group's folder.

5. Procedure

a. Materials and Equipment Needed

1) General

a. Cage
b. Screen cover for cage
c. Bottle to hold water
d. Food
e. Chips
f. Triple beam balance
g. No. 10 can
h. Ammonia cleaner
i. Towels
j. A metric ruler
k. Notebook for observations
l. Daily measurement log
m. Cotton - if the group desires
n. Pen or pencil
o. Gloves

2) Specific

a. Maze
b. Timer - Stop watch or a watch with a second hand
c. Cheese Crackers
d. Bell, rock record, record of mood music
e. Mouse
f. Data forms

b. Method

1) Build your maze as a group. See Information Sheet How to Construct a Maze. Your maze will be evaluated using the Maze Construction Evaluation Form.

2) Set up cages.

a. Use the proper amount of chips and food.

b. Make sure the water bottles work properly.

c. Tape a 3 X 5 card on your cage with your mouse's name and each person's name on it. Assign one person to bring the cage and return it to the Science Preparation Room.

3) Receive mouse. Practice handling the mouse.

4) Each person is to complete a Daily Measurement Log.

5) Have your mouse run the maze. See Information Sheet on Maze Running for specific directions.

6. Collecting Data

a. Record your data collected on the Maze Running Data Form.

b. Take observational notes on the physical appearance and behavior of your mouse in your notebook.

c. Calculate your data - Refer to the mini-unit "Graphing Data" for this.

7. Drawing Conclusions

a. Complete the Maze Running Conclusion Form.

b. As a group list 5 questions you have not answered in your experiment that you would like to investigate further.

8. Presentation of Findings

a. Each group is to present a written laboratory report for the experiment. Use the following format for this.

b. In your laboratory report include the following in order.

1) Your problem

2) Your hypotheses

3) List the materials used

4) List your procedures used. List each step you followed.

5) Present your observations. This will include (a) Daily Measurement Log, (b) Maze Running Data Form, (c) Mouse Observational Sheet and (d) Observational Notes on the physical appearance and behavior of your mouse.

6) Present your conclusions. This will include your (a) tallies, (b) graphs (c) maze running conclusion form, and (d) a paragraph stating whether your hypotheses were correct or not. Then state why or why not.

C. Continued Research in Independent Study

1. Individual students who wish to continue researching using their mice should arrange to see Mr. Fitzgerald or Mrs. Kravitz in Independent Study.

2. You may use your mouse and enough food and bedding to start your continued work. You may also have your mouse and any other mice that are available. However, we will not be able to let you use the cage since other students will need them. Cages can be arranged in Independent Study.

3. You will be able to arrange to be released from your I.U. classes if you wish for your independent study.

IV. RELATED UNITS

A. Explanation

As a part of our study of "Of Mice and Men" we will be working on two related units. Below is a brief summary of these units.

B. The Related Units

1. Graphing Data

This unit will run throughout the interdisciplinary unit. It is designed to help you learn how to collect

and organize quantitative data, to prepare and interpret graphs and to draw conclusions from graphs. During this mini-unit you will learn how to use mean, modes and medians so you can interpret your data collected from the learning experiments.

2. How We Learn

This unit deals with the story "Flowers for Algernon" by Daniel Keyes. As background for reading the short story, we will discuss levels of intelligence, retardation and learning and the nature of personality. We will then explore how we learn.

V. SCHEDULE

Day	Date	Time	Activity
1	Tues., Sept. 16	I.U.	Introduce Unit
2	Wed., Sept. 17	S.G.	Discuss Care of Mice
		Sci.	Review Measurement Procedures
3	Thurs., Sep. 18	S.G.	Practice Measurement Procedures
		Sci.	Review Measurement Procedures
4	Fri., Sept. 19	S.G.	Practice Measurement Procedures
5	Mon., Sept. 22	S.G.	Groups Assigned. Discuss How to Construct a Maze.
		Sci.	Discuss Mice As Laboratory Animals
		LA/SS	Introduce "How We Learn"
6	Tues., Sept. 23	E.A.	Build Maze
7	Thurs., Sep. 25	E.A.	Complete and Evaluate Maze
		I.U.	Review Care of Mice
8	Fri., Sept. 26	S.G.	Set up Cages
		M	Review Daily Measurement Log
9	Mon., Sept. 29	S.G.	Initial Observation Exercise
10	Tues., Sept. 30	S.G.	Receive Mice, Start Mouse Observation Sheet.
			Complete Daily Measurement Log
11	Wed., Oct. 1	S.G.	Complete Mouse Observation Sheet
			Complete Daily Measurement Log
12	Thurs., Oct. 2	S.G.	Complete Daily Measurement Log
			Write observations.
		M	Introduce "Graphing"
13	Fri., Oct. 3	S.G.	Complete Daily Measurement Log
			Write observations.
		S.S.	Discuss Maze Running

Day	Date	Time	Activity
14	Mon., Oct. 6	S.G.	Run Maze. Complete Daily Measurement Log. Write observations.
15	Tues., Oct. 7	S.G.	Run Maze. Complete Daily Measurement Log. Write observations.
16	Wed., Oct. 8	S.G.	Run Maze. Complete Daily Measurement Log. Write observations.
17	Thurs., Oct. 9	S.G.	Run Maze. Complete Daily Measurement Log. Write observations.
18	Fri., Oct. 10	S.G.	Run Maze. Complete Daily Measurement Log. Write observations.
19	Tues., Oct. 14	S.G.	Run Maze. Complete Daily Measurement Log. Write observations.
20	Wed., Oct. 15	S.G.	Run Maze. Complete Daily Measurement Log. Write observations.
21	Thurs., Oct. 16	S.G.	Return Mice. Clean cages.
22	Fri,, Oct. 17	S.G.	Work on Laboratory Report
23	Mon., Oct. 20	S.G.	Work on Laboratory Report
24	Tues.,Oct. 21	S.G.	Work on Laboratory Report
25	Wed., Oct. 22	S.G.	Work on Laboratory Report
26	Thurs., Oct. 23	S.G.	Complete and hand in Laboratory Report
27	Fri., Oct. 24	S.G. & I.U.	Evaluation of Interdisciplinary Unit

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INFORMATION SHEET

CARE OF MICE

I. Introduction

The laboratory mouse is a small animal. Its size makes it easy to handle, easy to house, and cheap to feed. Most laboratory mice are by nature gentle creatures. This is especially true when they are handled frequently in a considerate manner. When they are isolated and not frequently handled, they have a tendency to become timid and easily frightened.

Gentle handling is merely one of the many aspects required to produce well adjusted mice. Adequate food and housing are also necessary for the maintainance of a healthy laboratory mouse.

II. Housing

Each group of students will be provided with a cage suitable for housing their mouse. The cages will be constructed of plastic with a wire screen top or all metal.

Use the following procedures for cleaning the cage.

1. Clean the cage every week or two as needed.
2. Place the mouse in a secure box or container.
3. Clean out any food that may be found in the cage - place in food receptacle.
4. Throw away dirty chips in wastebasket. Do not spill chips on the floor.
5. Use ammonia cleaner to wash out cage.
6. Clean up excess wood chips in the sink. Make sure the lead stopper is in the sink drain.
7. Dry out the cage with paper towels. Only take what you need - tear paper properly from the dispenser.
8. Clean your water bottle while the cage is cooling. Use ammonia cleaner - clean the glass tubing by using the small test-tube brush.
9. Place enough wood chips in cage just to cover the bottom of cage. Too many woodchips will cause the water bottle to leak.
10. Place a sufficient amount of food in food receptacle. Do not waste food.
11. Measure the food and water.
12. Secure your water bottle on the lid of the cage.
13. Replace your mouse in the cage. Secure the cage.
14. Check the name card on the front of the cage.
15. Replace cage to its proper place.

Mouse quarters should ordinarily be kept close to 24°C (75°F), free of drafts, and with a relative humidity of about 50%. The humidity in the cages made of plastic with the wire tops will remain higher than in the wire cages because the solid sides and bottom keep much of the animals' exhaled water vapor within the cage.

III. Water

Fresh drinking water should be available at all times. Each mouse drinks about 6 ml. daily, if fed dry food. The water is
21 best supplied in a water bottle. A bottle with a capacity of about 125-180 ml. (4-6 oz.), which will take about a number 7 (or larger) rubber stopper, will serve the purpose. Use a one-hole stopper. Insert the drinking tube into the stopper.

The drinking tubes will be made from a glass tubing with an inside diameter of 6-9 mm. (1/4-3/8 inches). The end of the glass tube from which the animal drinks should be held in a gas flame until the opening is only 3 mm. (1/8 inch) in diameter. These dimensions should be adhered to carefully, otherwise the water bottle may leak (if the dimensions are too large) or the water may not flow (if they are too small). Rinse out water bottles and supply fresh water daily. Clean the bottle often with soap and water, rinsing well to remove excess cleaner.

IV. Food

Mice are nibblers and it is necessary that food be available continuously. Commercial mouse pelleted food is the recommended diet. A mouse will eat five grams of dry food a day, on the average. If special mouse food is not available, dry dog food (pellets) or crushed dog biscuits may be used. The dog food diet should be supplemented occasionally with raw carrot, potato, cabbage, rolled oats, whole wheat, or canary seeds. Dry foods should be in cage at all times, but other foods must be removed if not eaten promptly.

Pellets are generally placed in a feed box made of wire mesh. The feedbox is usually suspended from the top of the cage, or hung along the side near the top. The mice get at the pellets through the mesh. When the mice are fed in this manner, fecal contamination of food is avoided.

Food will be supplied.

V. Handling

As a precautionary measure, it is suggested that you wear gloves when handling your mouse. Although they are a gentle animal, they do nip on occasion.

In handling any animal, a fearful or uncertain human being provokes fear and uncertainty in the animal. Avoid quick movement and uncertain ones. Instead, use calm and deliberate movements. In handling mice, use enough firmness to restrain the animal, but not enough to cause pain or injury.

A mouse is most easily picked up by the tail. A right-handed person should use his left hand to grasp the tail near its base. Do this without unnecessary roughness. Place the other hand over the back of the animal. Be careful not to squeeze the mouse.

Precautions: Be sure to grasp the tail near its base, not toward the tip. The skin can be stripped off the tail if it is grasped too far back. Do not suspend the mouse by the tail except for a short period of time.

Hopefully, you will be able to train your mouse to climb into your hand. This can be accomplished by placing a small amount of food in your hand and waiting patiently for the mouse to investigate. Eventually the mouse will climb into your hand without fear.

VI. First Aid for Mice - There may be times when your mouse appears to be sick. It is important that you recognize these times so that measures can be taken to correct the illness and prevent it from
22 occuring again. Perhaps the mouse is not getting enough water or food--or it may have been carelessly handled. Consult with your team to diagnose the illness. Let the team teachers know of your concern about the health of your mouse and proceed from there.

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INFORMATION SHEET
MICE AS LABORATORY ANIMALS

I. INTRODUCTION

The histories of men and mice have long been intertwined. Thousands of years ago, when people still lived in wandering tribes, certain tribes realized that it was possible to cultivate wild grasses and to harvest and store the seeds or grain. With this discovery, agriculture began and farming became a way of life. The wandering tribesmen no longer needed to move about in search of food. They could stay in one place, raise crops and supplement their food supply by hunting and fishing. The earliest farming settlements that archaeologists have found are in an area now made up of northern Iran and Soviet Turkestan. The laboratory mouse and common house mouse, called Mus musculus, are descended from the same ancestors which happened to be native to the area where people first became farmers and established permanent settlements.

During the next 3 or 4 thousand years, the farming communities grew and more places became available for mice to find shelter. With the geographical expansion that began around 4,000 B.C., the mouse journeyed from its original homeland into northern Africa, Europe, India and China. The mice prospered, multiplied and spread despite the efforts made to eliminate them. The early Egyptians discovered that the cat was one of the most efficient mousetraps in the ancient world. Still other ancient people made a sacred animal out of the white mouse. The mouse appears in the literature used in worship services of religious cults in Asia, North Africa, Germany and Greece. Even the Japanese have included mice in their folk tales.

The mouse was not used as a research tool until the 19th century when a number of European zoologists attempted to study the genetic inheritance of coat color found in fancy mice raised by some people as a hobby. The man who did most to turn the fancy mouse into the laboratory mouse was Clarence Cook Little. He began breeding mice in 1909, when he was an undergraduate at Harvard University. Cook was interested in finding out whether Mendel's Laws of Heredity concerning plants could also be applied to animals. From that time, the laboratory mouse has assumed a very important role in scientific research.

II. WHY MICE ARE LABORATORY FAVORITES

There are many reasons why Mus musculus has long been the most widely used laboratory animal in the world. Foremost among the reasons for their popularity is that they are mammals just as humans are and happen to be highly susceptible to many of the diseases that afflict human beings.

Some other reasons for their use as laboratory animals include:

1. Their small size which makes them easy to handle, house, and cheap to feed.
2. They breed readily and often - several times a year.
3. They produce good sized litters making many animals available for research.
4. There are more than 200 genetically uniform strains available
5. They have been more carefully and thoroughly studied than any other laboratory animal.
6. They have short gestation and weaning period.
7. They are relatively inexpensive to purchase.

III. HOW THE MOUSE IS CLASSIFIED

Name of Grouping	Scientific Name	Common Name	Members Include
Kingdom	Animalia	Animals	All living things that feed on other organisms and have bodies made of many cells.
Phylum	Chordata	Chordates	All animals with backbones: mammals, birds, reptiles, amphibians, fishes.
Class	Mammalia	Mammals	All chordates that have mammary glands and that suckle their young on milk, such as dogs, cats, horses, mice, elephants, whales, bats human beings.
Order	Rodentia	Rodents	All gnawing mammals that have only two front teeth in each jaw, such as mice, rats, beavers, porcupines, squirrel guinea pigs.
Family	Muridae	Murids	All rodents that are Old World mice and rats, such as the house mouse, the black rat, the Norway rat.
Genus	Mus	Old World mice	All Old World mice that share a certain formation of teeth and jaw, such as the house mouse and about fifteen close relatives.
Species	Mus musculus	House mouse	The house mouse alone.

IV. BASIC DATA ON THE LABORATORY MOUSE

Daily H_2O consumption	4.2-6.9 ml.
Daily food consumption	3-5 gm.
Average litter size	6-9
Birth weight average	0.5-1 gm.
Eyes open	Average 11th day
Begin to eat solid food	Average 11th day
Average adult female (♀) weight	25-40 gm.
Average adult male (♂) weight	20-40 am.
Breeding life female (♀)	6-10 litters
Breeding life male (♂)	1-1.5 years
Daily urinary volume	1-2 ml.
Gestation period	19-21 days
Age at weaning	21 days
Age at puberty	35 days
Age at mating	6-10 weeks
Breeding season	Throughout year
Chromosome number	40
Temperature (rectal)	97.5 F. (37.4C.)
Life-span	Average 1-2 years; max. 3+ yrs.
Blood pressure	Systole 147, diastole 106
Heart rate (beats/min.)	350-750

V. RESEARCH AND THE LABORATORY MOUSE

At first thought, it might seem most logical to study human diseases using only human beings. However, most humans do not wish to be the center of an experiment. In addition, man would make a poor laboratory animal because he doesn't care to live under extremely controlled conditions, he costs too much to take care of, he lives too long and he breeds too slowly. Mus musculus has become the laboratory stand-in for man.

Mice have been or are involved in the following laboratory research.

1. Cancer Research--Investigations into the cause, prevention and treatment of cancer.

2. Drug Research--The testing of new chemicals-be it food coloring or a new antibiotic-must be performed before public release to insure against harmful side effects.

3. Bioassay--Many substances administered to man for preventive or therapy purposes have to be tested on animals before being offered to humans.

4. Nutritional Research--The nutritional requirements to produce adequate growth and maintenance are first observed in mice and then examined in terms of how a human would be affected by a similar diet.

5. Radiation Exposure--The effects of radiation on genetic material, tumor production and aging are now being investigated.

6. Cytogenetics--Many foods, food additives, drugs and other household articles (sprays, soaps, etc.) are being tested to determine their effects on chromosomes and possible genetic mutations.

7. Behavior and psychological Studies--Human behavior is difficult to study and analyze since man is such a complex animal. Research on the behavior of the mouse may unlock many doors regarding the behavior of man.

VI. CONCLUSION

Mus musculus has come a long way since the time when he became an integral part of the first agricultural settlement. From field mouse to laboratory mouse has taken thousands of years. Today laboratory mice are used in ever increasing numbers to solve difficult problems in the medical and behavioral sciences. The human race has benefited greatly from the relationship between man and mouse.

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INTERDISCIPLINARY UNIT: OF MICE AND MEN

MOUSE OBSERVATION SHEET

Name of Student _____

Name of Mouse _____

Date _____

Directions:

1. Each person should complete the following individually.
2. Keep this sheet in your folder.
3. Complete all measurements in the metric system.

1. How many of each of the following does your mouse have?

a. toes	_____	e. mouth	_____
b. whiskers	_____	f. ears	_____
c. feet	_____	g. eyes	_____
d. tail	_____		

2. What colors are the following parts of your mouse?

a. eyes	_____	e. tongue	_____
b. whiskers	_____	f. teeth	_____
c. tail	_____	g. inside of ears	_____
d. fur	_____	h. bottom of feet	_____

3. How much does your mouse weigh? _____
4. How long is your mouse's tail? _____
5. How long is your mouse's body? _____
6. How long is your mouse from the top of his nose to the top of his head to the tip of his tail? _____
7. How long is your mouse's longest whisker? _____
8. What size shoe do you wear? _____
9. Then what size shoe would your mouse wear? _____
10. How can you tell if your mouse is hungry? _____

11. In what position does your mouse usually eat -- on all fours or sitting back on his hindquarters?_____

12. Can you hear him chew? _____

13. Does your mouse drink water? If he does, <u>how</u> does he drink? If he does not, <u>how</u> does he get enough water to stay alive?

14. What color do you think your mouse's mother was? _____

His father?_____ Explain your answers:

_____

_____

_____

_____

_____

_____

_____

_____

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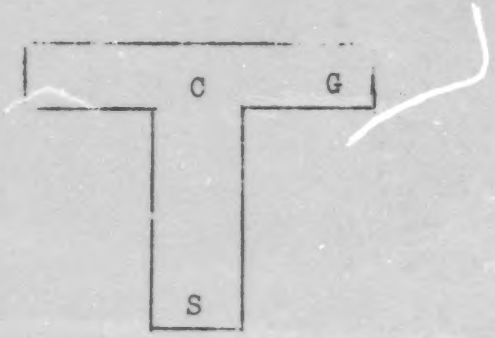
INTERDISCIPLINARY UNIT: OF MICE AND MEN

INFORMATION SHEET

HOW TO CONSTRUCT A MAZE

I. INTRODUCTION

A maze is a device used in learning or problem-solving situations. Basically, a maze has a starting point, a series of pathways and choice points, and a goal or outlet. The simplest maze is a T-Maze, so named because of its shape. It has a starting point(s), one choice point (c) located along the path and a goal (g).



T-Maze

S - starting point

C - choice point (mouse must turn right or left to get reward)

G - goal, mouse receives a reward if he goes to goal end.

II. MATERIALS NEEDED:

A. Cardboard. Enough for the platform and walls of the maze.

B. Contact cement

C. Cutters

D. Meter stick or ruler

E. Masking tape

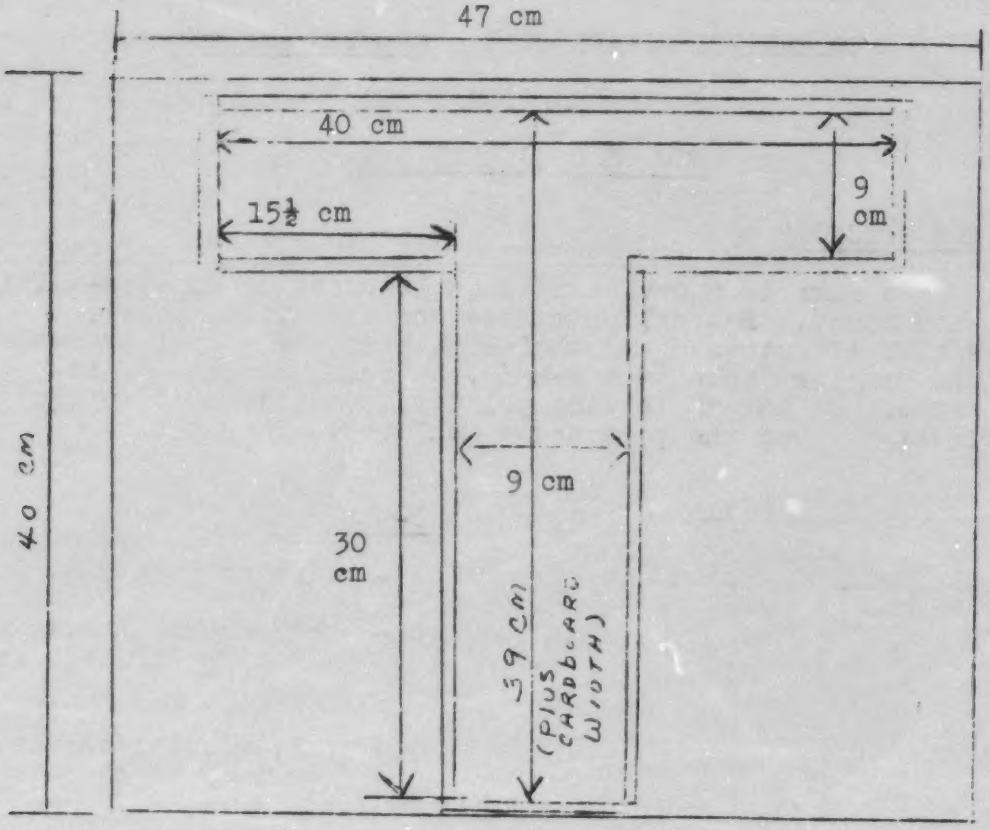
F. Pencil

G. Poster paint - optional

H. Brushes - optional

III. PROCEDURES

A. Diagram:



B. Steps

1. Use a 40 cm X 47 cm piece of cardboard as the platform.

2. Draw the inside outline of the T-Maze on the platform. Center the maze. Use straight lines which are measured exactly. NOTE: Make inside dimensions correct. Don't forget to allow for the width of the cardboard when measuring.

3. Sketch wall sizes onto cardboard then cut out:

   1 piece of cardboard 40 cm long X 10 cm high
   2 pieces of cardboard 15½ cm long X 10 cm high
   2 pieces of cardboard 30 cm long X 10 cm high
   3 pieces of cardboard 9 cm (plus 2 times width of cardboard) long X 10 cm high

4. Put your group's name on each piece.

5. Place walls along measured line of platform and sketch width of cardboard walls. This is the outside line.

6. Apply contact cement between double lines on platform and along edge of wall. Allow cement to set until it is dry to touch. Do one wall at a time.

7. Place walls, one at a time, onto platform.

8. Using masking tape, connect the walls. Place tape on the outside only.

9. Evaluate your maze on the Maze Construction Evaluation Form.

10. Present the maze to one of your teachers for evaluation.

C. Option

1. Any group that has extra time after your teacher has evaluated and approved the maze may place designs on the outside of the maze.

2. Work in the paint areas for this work.

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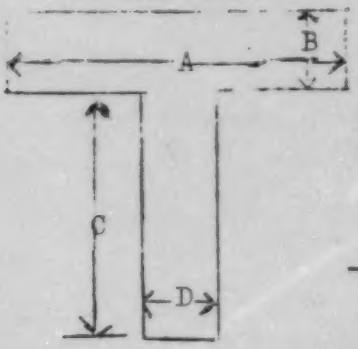
INTERDISCIPLINARY UNIT - OF MICE AND MEN

MAZE CONSTRUCTION EVALUATION FORM

Names _____ _____ Group _____

_____ _____

Directions: As a group evaluate your maze for each criteria in Column I, by placing an X under Yes or No. Your instructors will evaluate your maze in Column II.



	I Group's Evaluation		II Teacher Evaluation	
	Yes	No	Yes	No
I. ACCURACY				
A 40 cm				
B 9 cm				
C 30 cm				
D 9 cm				
E 10 cm high				
II. DURABILITY				
A. The walls are sturdy				
B. The platform is stable				
III. NEATNESS				
A. Glue doesn't show				
B. There are no gaps between the walls				
C. The interior surface is smooth and clean				
IV. SAFETY FACTORS				
A. No sharp edges				
B. No distracting features				
V. GROUP WORK				
A. Everyone shared the work				
B. The group cooperated				
VI. PROMPTNESS - It is now on or before: _____				

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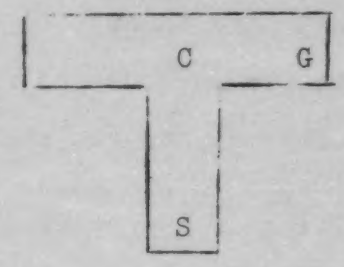
INTERDISCIPLINARY UNIT - OF MICE AND MEN

INFORMATION SHEET

MAZE RUNNING

I. INTRODUCTION

In order for a mouse to successfully run a maze, he must begin at the starting point, move along the path, make the correct turn at the choice point and move to the goal end of the maze. When he reaches the goal, he receives a reward.



S = Starting Point
C = Choice Point
G = Goal

II. PREPARATION

A. Place maze in a secure, uncluttered area.

B. Be sure each person is ready to complete his job. This is the

1. Timer
2. Mouse Handler
3. Observer Notetaker
4. Reward Giver

C. Put the reward at the goal end (right side) of maze.

D. There should be no talking or other distractions during experiment.

III. TIPS

A. In the first few times in the maze, expect the mouse to explore and sniff out all the sections of the maze. Mice learn to run the maze by trial-and-error learning. That is; the mouse "accidentally" discovers a reward the first few times he is placed in the maze. Soon the mouse "learns" that if he moves through the maze, he will be rewarded. As the mouse learns, he should reduce his roaming around or random behavior and only display behavior aimed at getting the reward. The time required for the mouse to run the maze should show some reduction.

B. The mouse may be handled and played with at certain times, but not near maze running time.

IV. DIRECTIONS

A. Enter the room and sit with your group.

B. Place all your books in the chair rack.

C. Get the maze, your folder, and the reward.

D. Place the reward in the right hand corner of the T-maze on the dot.

E. Be sure each person is ready to complete his job. These are:

(a) Timer

(b) Mouse Handler

(c) Observational note takers (2)

F. Sit silently and wait for further instructions.

G. When directed to by the advisor get the mouse cage and wait. Do not remove the lid or the mouse from the cage. Observational note takers should start their observations. while the mouse is still in the cage.

H. When directed to by the advisor take the mouse out and place him directly into the T-maze at the starting point facing the choice point. DO NOT play with the mouse, pet or excessively handle him. If any distractions occur (i.e. mouse is dropped), record this fact in your observational notes.

I. Start timing as soon as you take your hand off the mouse. DO NOT prod or verbally coax the mouse.

J. Cover the maze with your clear plastic cover.

K. When the mouse nibbles at the reward for 5 seconds, stop your timing. Subtract 5 seconds from the total time and record this on your Maze Running Data Form.

L. When your mouse finishes nibbling on the reward, place him directly back in the cage and sit silently. Secure the cage. Do not put unfinished reward in cage. Throw it away.

M. When directed to by your advisor weigh and measure your mouse and record its weight and length in the proper place.

N. Return cage and equipment to the proper storage area. Clean up the room.

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INTERDISCIPLINARY UNIT -
OF MICE AND MEN
DAILY MEASUREMENT LOG

DAY	DATE	TIME OF DAY	BODY LENGTH	WEIGHT	AMOUNT OF WATER TAKEN	AMOUNT OF FOOD CONSUMED
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

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MAZE RUNNING DATA FORM

Directions:

Record all the data in the proper space below. If your mouse does not run the maze after 10 minutes take him out of the maze and return him to his cage. Then record "did not complete maze" as DNCM.

Trial	Date	Day	Time of Day	Room Temp. C	F	Running Time
Example	10/28/74	Monday	10:30 a.m.	20°	68°	6 min., 37 sec.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

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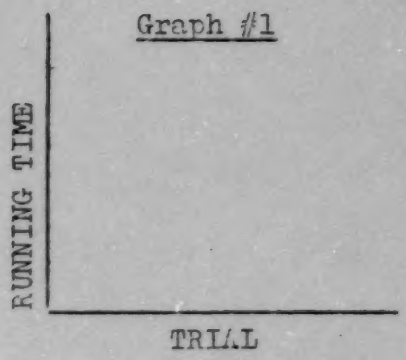
INTERDISCIPLINARY UNIT
OF MICE AND MEN

INFORMATION SHEET

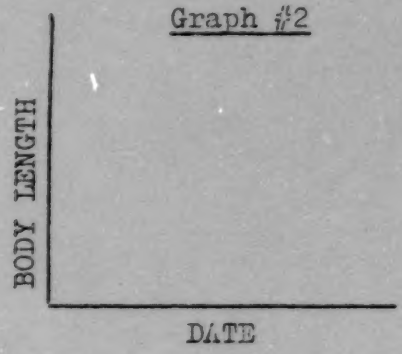
LABORATORY REPORT GRAPHS

Directions: Each individual student needs to complete 3 line graphs based on our experiments. Write a title and label each graph. These graphs will be placed in your written Laboratory Report. Be sure your name, group number and homeroom is on all graphs.

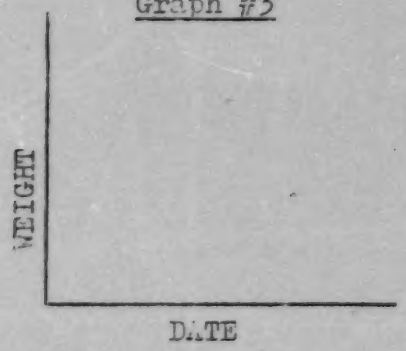
Graph #1



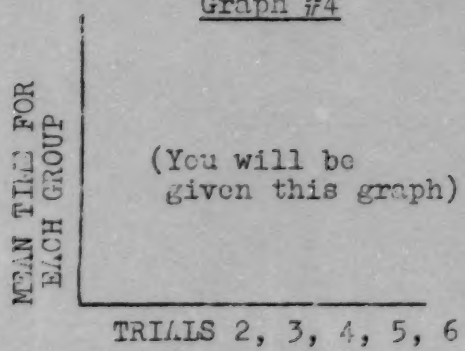
Graph #2



Graph #3



Graph #4



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INTERDISCIPLINARY UNIT: OF MICE AND MEN

MAZE RUNNING CONCLUSION FORM

NAME _____

GROUP _____ H.R. _____

DIRECTIONS: Each person will turn in answers to the following questions. The questions are designed to help you to think and draw conclusions. Your answers should reflect this thought.

I. Mouse Data

1. Record the mean weight of your mouse.

2. Record the mean length of your mouse.

3. Do you think the size of the mouse will effect the learning experience? Explain your answer.

II. Use the graph (Graph #1) that shows your mouse's individual times to answer the following questions except as noted.

A. Question 1.

1. Which day did your mouse eat the reward in the least time?

2. What significant behavior is indicated in your observational notes for this day?

3. Is there any significant change in your mouse's weight or length for this day? Explain. (See Graphs #2 and 3)

B. Question 2.

1. Which day did your mouse take the longest time to eat the reward?

2. What significant behavior is indicated in your observational notes for this day?

3. Is there any significant change in your mouse's weight and length for this day? Explain. (See Graphs #2 and 3)

4. What are the similarities with the mouse's behavior on the longest day and shortest day?

5. What differences in the observational notes for these two days seem significant?

6. Is there a change in the temperature between these days?

C. Question 3.

1. Does Graph #1 seem to show a pattern? Explain your answer.

2. Is there a day that shows a radical change in the time it took the mouse to complete the maze? When?

3. Was the change noted above faster or slower?

4. Why do you think the change happened?

5. What significant behavior is indicated in your observational notes for this day?

6. Is there a change in the temperature the day the radical change took place?

7. Is there any significant change in the weight and length of your mouse? Explain. (See Graphs #2 and 3)

III. Use the graph (Graph #4) that shows the comparison of all the group's means running time.

1. Which group of mice seemed to learn the fastest? Why?

2. Which group of mice seemed to have the most difficulty in learning? Why?

3. Are there similarities between how two or more groups of mice ran the mazes? Why do you think this happened?

4. Write the hypotheses here that you wrote prior to the experiment.

4a. Do these graphs prove or disprove your hypotheses?

4b. Why?

IV. Do you think our controlled experiment is valid? (able to prove or disprove something) List the changes that would be necessary to make it more valid.

V. List ten questions that you have not answered in your controlled experiment that you would like to investigate further.

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Team 8

RELATED UNIT

HOW WE LEARN

I. INTRODUCTION

A. Think About It

"I think it's a good thing about finding out how everybody laughs at me. I thought about it a lot. It's because I'm so dumb, and I don't even know when I'm doing something dumb. People think it's funny when a dumb person can't do things the same way they can."

Charlie in "Flowers for Algernon," Progress Report 11

"Once again now, I have the feeling of shame burning inside me. This intelligence has driven a wedge between me and all the people I once knew and loved. Before, they laughed at me and despised me for my ignorance and dullness; now they hate me for my knowledge and understanding. What in God's name do they want of me?"

Charlie in "Flowers for Algernon," Progress Report 12

B. In this unit related to our interdisciplinary unit "Of Mice and Men" we will explore how people learn, the nature of intelligence, and study the work "Flowers for Algernon."

II. LEARNING OBJECTIVES - Each student will demonstrate his/her ability to:

A. . . . list various factors influencing perception.

B. . . . identify reasons for differences in people's personalities.

C. . . . explain, in writing, how intelligence is determined.

D. . . . discuss, in writing, how people learn.

E. . . . infer motives and ideas from a character's thoughts, words, and actions.

F. . . . recognize the difference between objective and subjective description.

G. . . . identify the theme of a literary work.

H. . . . draw conclusions and predict outcomes from sets of facts and events.

I. . . . identify the author's purpose and the point of view from which he speaks.

J. . . . understand the relationship between form and content.

K. . . . understand the difference between a short story and a novel.

L. . . . apply knowledge about learning and retardation to problems faced by Charlie in "Flowers for Algernon."

M. . . . evaluate how well he/she accomplished the above objectives.

III. MAJOR ACTIVITIES

A. Background

1. Discussions - We will have a number of discussions for each of the topics listed below:

a. Personalities: How people react differently to different people.

b. Intelligence: What is Intelligence? How is it measured? What are levels of Intelligence?

c. Retardation and learning: How Retardation is caused.

d. Perception: How people perceive different things.

2. Ink blot activity - Details will be explained in class.

B. "Flowers for Algernon" - Short Story Reading

1. We will view the film "Charley" in class.

2. After seeing the film "Charley" we will read aloud in class the short story "Flowers for Algernon". While reading the story, we will periodically break up into three groups for discussions. Groups will be assigned in Language Arts and Social Studies.

C. Reading - Novels

1. Each person is to select and read one of the following novels. They are listed below from easiest (a) to most difficult (e). Select the novel nearest your own ability level in reading.

a. Teacher, Teacher
b. Twink
c. Sandy
d. Run Wild, Run Free
e. Flowers for Algernon

2. After you pick your novel, check with your teacher to have it approved. You will then be given a worksheet to complete for your novel.

D. Learning Stations

1. While we are working on our readings, we will also be working on Learning Stations.

2. See the "General Directions for Learning Stations" for details.

IV. CALENDAR

Day	Date	Time	Activity
1	Mon., Sept. 29	L.A./ S.S.	Introduce Unit
2-5	Tues., Sept. 30 Fri., Oct. 3	S.S.	Background Discussion on Learning
6	Mon., Oct. 6	All I.U.	View "Charley"
7-9	Tues., Oct. 7 Thurs., Oct. 9	L.A./ S.S.	Reading "Flowers for Algernon"
10-17	Fri., Oct. 10 Wed., Oct. 22	L.A./ S.S.	Reading novels and Learning Stations. See detailed schedule.
18	Thurs., Oct. 23	L.A./ S.S.	Review discussions.
19	Fri., Oct. 24	L.A./ S.S.	Evaluation Exercises

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UNIT: HOW WE LEARN
DISCUSSION QUESTIONS FOR THE
SHORT STORY - "FLOWERS FOR ALGERNON"

A. From the Beginning to April 9

1. How did Charlie know that he had failed the "Raw Shok" (Rorschach) test?

2. What is "motor-vation"?

3. What is a guinea pig?

4. Why did Charley want the operation? Why did he want to be smart?

5. Are Joe Carp and Frank Reilly really Charley's friends? Explain. Cite some incidents.

6. If Charley were working with you, how would you treat him? As a general rule, are we considerate of others less fortunate than ourselves? Explain.

7. What kinds of feelings do you have for Charlie Gordon?

8. Who is Algernon?

9. In the beginning, Charlie disliked Algernon. His feelings did change, tho. When and why? From his many remembrances, what was Charlie's life like when he attended P.S. 13?

10. What type of operation did they have?

11. Why did he have to keep a journal?

12. Why does Charley want the operation to succeed? Is the will to succeed a constructive or destructive force? Can it be both at the same time?

13. How does Charley feel immediately after the operation?

B. From April 9 to May 18

1. Why do you suppose the author chose to tell Charley's story using diary form? How does this form affect the content?

2. What are some of Charley's outstanding characteristics? Give examples.

3. What first gives him hope for becoming smart? How does this incident change his attitude toward Algernon?

4. What is Miss Kinnian's attitude toward the operation?

5. Why did Charley lose his job? What is his reaction?

6. What is Charlie's opinion of Dr. Nemur? Dr. Strauss? Explain.

7. In spite of the very strange things that happen to him, Charlie seems very real. Can you explain why this is so?

C. From May 18 to the End

1. Miss Kinnian, Charley's landlady, and the factory workers all have different attitudes toward Charlie at different times in the story. Explain how each feels about Charley (a) before his operation (b) as his intelligence increases (c) as he regresses.

2. What was the mistake Dr. Nemur made that only Charley recognized? Why is it important?

3. That night in the diner, what was it about the boy who worked there, that looked so familiar to Charley?

4. As a result of this occurrence at the diner, what decision did Charlie reach about his future?

5. How did Algernon's behavior change? Why was this important to Charley?

6. What are the differences and similarities of the old and new Charlie?

7. If a doctor in a research lab offered you a change at an operation designed to double your intelligence, would you take it? Explain.

8. To what extent should science affect the lives of individuals? Explain.

9. If you could be twice as intelligent, would you be twice as happy? Why? Why not? Was Charley? Explain.

10. Is there any truth in the statement "ignorance is bliss"? If there is, would you prefer it?

11. What is the significance of the title "Flowers for Algernon"?

12. What was the major theme(s) of "Flowers for Algernon"?

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WORKSHEET

TEACHER, TEACHER

Directions: Answer the questions on a separate sheet of paper. You do not have to rewrite the question.

1. What kind of life has Freddie had up until Cade arrives?
2. Why has Cade lost his past jobs?
3. Why does Putnam decide to hire Cade?
4. Why does Putnam keep Freddie on the estate? Is this good or bad for Freddie? Why or why not?
5. Why does Freddie like Carter immediately?
6. On page 108 Cade says "He's very slow. I suppose you noticed." How might this attitude hinder Freddie's development?
7. How does Cade feel toward Carter?
8. Is it true that only Cade is Freddie's teacher? Why or why not?
9. What does Carter teach Freddie?
10. How can this help Freddie?
11. What is the difference between how Carter and Cade teach Freddie right from left?
12. Which is a better method? Why?
13. How does Carter help Freddie read?
14. What is Cade's reaction to this?
15. Cade claims that "Someday that kid will have to leave this house and face the world." What methods will help Freddie do this? Whose teaching methods do this?
16. What is Carter's criticism of Cade? Look on p. 119. Do you agree or disagree? Why or why not?
17. Why does Freddie run away?
18. How does Freddie cope with the outside world?
19. If you had a retarded brother or sister, how would you teach them?

20. Are retarded individuals hopeless cases? Why or why not?

21. What frustrations are there in teaching the retarded?

22. What are the characteristics of the learning of a "retarded" child compared to an "average" child?

BECK MIDDLE SCHOOL
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WORKSHEET

TWINK

DIRECTIONS: Answer the questions on a separate sheet of paper. You do not have to rewrite the question.

Discussion Questions

1. What was Harry's reaction to his first meeting with Twink?
2. Describe what Twink looked like?
3. In what ways is Twink different from other kids?
4. What initial problems did Harry face when he arrived home?
5. At that point did he possess any barriers to overcoming these problems?
6. What particular problems does Twink face in growing up?
   (a) What startled Harry about Carl's condition?
   (b) What particular problems did Carl have to overcome?
7. How did Twink reconcile herself to her problem?
8. (a) How does Twink communicate?
   (b) What problems are involved in this method?
   (c) In what other ways could she have communicated?
9. (a) Why was Harry surprised at Twink's question on page 26?
   (b) What did she mean by the question?
10. (a) How did Twink react to her new family?
    (b) How did they react to Twink?
11. (a) What particular problems did Twink's parents face because of Twink's illness?
12. Initially what type of treatment did Ellie and John hope for Twink?
13. (a) Who was Dr. Parker?
    (b) How did he overcome his problem?
14. (a) What did Dr. Parker suggest for Twink?
    (b) What options did Ellie and John have to consider in their decision?

(c) Do you feel they made the best decision? Why or why not?

15. (a) What was Whizzer like?
    (b) How was she helpful to Harry?
    (c) What particular problems did Whizzer face because of Twink?
    (d) Was she able to overcome her problems? How?

16. What happened to Twink at Oxford Mountain?

17. (a) What possibilities for improvement did they offer Twink?
    (b) What were the advantages/disadvantages of each possibility?
    (c) What was Twink's decision? Why?
    (d) In your opinion was it a good decision? Why?
    (e) What were the consequences of her dicision?
    (f) Do you think Twink regretted her decision? Why or why not?

18. From what point of view was this book written? How did this affect the content?

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WORKSHEET

THE STORY OF SANDY by Susan S. Wexler

DIRECTIONS: Answer the questions on a separate sheet of paper. You do not have to rewrite the question.

1. Describe Sandy the first time "Sukey" saw him.
2. What was Sandy's relationship to "Sukey" and "Pa-Joe"?
3. Why did Tommy live with "Sukey" and "Pa-Joe"?
4. Why did Mary give Sandy away?
5. How did their friends react to Sandy?
6. What was the Wheaton doctor's diagnosis for Sandy?
7. What was their "first crumb of comfort"?
8. What is a rocker?
9. Why did Sandy like Christmas so much?
10. What was the name of the first book they gave to Sandy?
11. Describe Sandy's table manners.
12. What was Dr. Carey's prescription for Sandy?
13. What happened in Manistree?
14. Who was Handyman?
15. What was Sandy's reaction to finger paints? Why? Did he ever change his mind? How?
16. Describe "Mary's Pet Giraffe".
17. Why did Sandy love England?
18. Did Sandy enjoy being in Frankie's wedding? How do you know? How did Sandy react to Frankie's wedding after the ceremony?
19. How did Windswept help Sandy?
20. Who was Elizabeth? How did Sandy react to her?
21. What sport brought out the best in Sandy? Why?
22. To what level did Elizabeth help Sandy to develop?
23. What grade was he in when the story ended?

24. From what point of view is this book written? How does it affect the content?

25. Describe in as much detail as possible Sukey? Pa-Joe?

26. In what ways was Sandy different from other children his age?

27. Describe Sandy at the end of the book?

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WORKSHEET

RUN WILD, RUN FREE

Directions: Answer the following questions on a separate sheet of paper.

1. What is Philip's relationship with his mother?

2. What is his relationship with his father?

3. Which do you think is the healthier relationship?

4. In what ways was Philip's childhood development "normal"?

5. Why was it not possible to make any estimate of Philip's I.Q.?

6. Did Philip's parents give the clinic treatment a fair chance?

7. What reasons did they give for discontinuing it?

8. Can you suggest the "real" reasons?

9. How was Philip's relationship with the colonel different from that with either of his parents?

10. Describe the Colonel?

11. What was his mother's reaction when the colonel told her that Philip had spoken to him?

12. Why did Philip call the colt by his own name?

13. In what ways is Philip like the cold?

14. What particular incident caused Philip to regress?

15. How did they finally mend their relationship?

17. Describe the Colonel?

18. Who was Pegasus? (p. 142)

19. What finally forced Philip to speak?

20. How did Philip repay the Colonel's interest?

21. Did Philip have the same relationship with the pony after he was tamed?

22. How did Philip react to the falcon's death? How did the Colonel?

23. What is the significance of the title?

24. In your opinion, was the pony better off before or after he was tamed? How about Philip?

25. How was Philip different from others? How did people treat him?

26. How did he learn to "come out of his shell"?

27. From what point of view is the story told?

BECK MIDDLE SCHOOL
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WORKSHEET

FLOWERS FOR ALGERNON

Directions: Answer the questions on a separate sheet of paper. You do not have to rewrite the question.

1. From the first progress report, what do you already know about Charlie?
2. How did Charlie know that he had failed the "raw shok" (Rorschach) test?
3. What is your opinion of his mother and sister? Why?
4. What is "Motor-vation"? (p. 7)
5. What does an I.Q. of 68 indicate about Charlie's intellectual ability?
6. On page seven, the following words appear. Nest to each, write the correctly spelled equivalent.

   a. Intelek
   b. ment
   c. host
   d. uncoop
   e. apathet
   f. natcher
   g. overwhelm

7. What is a guinea pig?
8. Why did Charlie really want the operation? Why did he want to be smart?
9. Why did they change Charlie's nurse from Hilda to Lucille?
10. Are Joe Carp and Frank Reilly really Charlie's friends? Why? Cite some specific incidents.
11. While reading which report did you begin to notice a change in Charlie? Be specific and give reasons.
12. In the beginning, Charlie disliked Algernon. His feelings did change, though. When and why?
13. Why is it essential for Charlie to visit Dr. Strauss on a regular basis.

14. What did Charlie discover about Gimpy at the bakery? How did he handle the situation? Do you agree with his actions? Why?

15. From his many remembrances, what was Charlie's life like when he attended P.S. 13?

16. What kind of a man was Mr. Donner? Explain your answer with specifics.

17. Why did Charlie lose his job? What is his reaction?

18. How does the free association work?

19. Who was Dr. Gaurino and what effect did he have upon Charlie's life?

20. What is Charlie's opinion of Prof. Nemur? Why?

BECK MIDDLE SCHOOL
CHERRY HILL, N. J.

Team 8

LANGUAGE ARTS/SOCIAL STUDIES

HOW WE LEARN

GENERAL DIRECTIONS FOR LEARNING STATIONS

Purpose

1. To provide a variety of in-depth experiences related to our related unit, How We Learn.

2. To provide an opportunity for you to work independently at your own pace and ability level.

3. To provide an opportunity for you to work in an open room.

LEARNING STATIONS

A. Around the room are 8 Learning Stations. All Learning Stations are required. Below are listed the general directions for each station. More specific directions will be listed at the station.

1. Learning Station 1 (LS-1) - SPELLING

This station has 2 levels, A and B. Level A is easier than B. Take the worksheet which seems to fit your ability best. Follow the instructions on that worksheet. Take the worksheet to the work area. In one area of the room is an Answer Station. Take the answer sheet and correct your own work. Then place the completed worksheet in your homeroom's Answer Box.

2. Learning Station 2 (LS-2) - TRIAL AND ERROR - You will need a partner.

There is one level at this station. Take (a) the direction and recording sheet, (b) the book: Exploring Life Science and (c) a puzzle in an envelope to the work area. Complete the station and place your results in your homeroom's Answer Box.

3. Learning Station 3 (LS-3) - ASSOCIATIVE LEARNING SYSTEMS - You will need a partner.

There is one level at this station. Take the direction and recording sheet to the work area. You will be taking the pre test here. Next go to the listening station where you will find the tape. Complete the station and place your results in your homeroom's Answer Box.

4. Learning Station 4 (LS-4) - PROBLEM-SOLVING

There are 8 levels at this station. These consist of a set of 8 overheads and a blank answer sheet. You will need to use the overhead projector. Place the first overhead on the projector. Use the blackboard as a screen. Using chalk, fill in the chart. Transfer your final answers to the answer blank. Do this for each overhead.

The overheads become progressively harder. 1 is the easiest, 9 is the most difficult. Continue until a level is too difficult for you to do. Check your results at the Answer Station. Then place your answers in your homeroom's Answer Box.

5. Learning Station 5 (LS-5) - MAZES - You will need a partner.

This station has 1 level. Take a recording sheet and copies of 2 mazes and the book Exploring Life Science. Directions are given on the recording sheet. Turn your results in at your homeroom's Answer Box.

6. Learning Station 6 (LS-6) - NEWSPAPER ARTICLES

At home complete the following:

a) Cut out of a newspaper or news magazine one (1) article on mental illness or physical handicaps in the U.S.

b) Put your article on a sheet of unlined paper 8½ X 11.

c) List on the paper how the article answers the how, when, where, why, who, and what.

d) Place articles in your homeroom's Answer Box.

7. Learning Station 7 (LS-7) - CHARLIE'S WRITING

This station has 3 levels. Level A is the easiest and level C the hardest. Select the level appropriate for your ability to write. Complete all work on the worksheet and place the worksheet in your homeroom's Answer Box.

8. Learning Station 8 (LS-8) - OPTION

Complete this station if you have extra time and have finished all the other stations.

B. ANSWER STATION

One area in the room is an Answer Station. Answer sheets for LS (1) and LS (4) are provided. After you complete your work go to the Answer Station and check it. Correct your mistakes and make sure you understand the corrections. If you do not understand why something is wrong, see an advisor. The Answer Station gives you an opportunity to cheat if you so desire; however, you are only cheating yourself.

C. ANSWER FOX

There is an answer box for each homeroom at the Answer Station. After you have checked your papers at the Answer Station, put your worksheet in the answer box with your homeroom's number on it. Be sure your name, homeroom, and Learning Station number and level is on each worksheet.

D. On the first day that we begin working in learning stations, your teachers will assign you to a station. From then on you will work through Learning Stations 1-8 at your own pace. These may be visited in any order but all of them must be completed and you must follow the following rules:

1. As soon as you complete one station, move on to the station that is the least crowded.

2. Complete the worksheets for the station in the work area whenever possible. Make sure you return all materials (books, overheads, articles, etc.) to the station by the end of class.

E. As you complete each station, you will put your work in your homeroom's answer box at the Answer Station. Then go to the front of the room where the group lists are posted. Check off the stations and levels as you complete them in the spaces next to your name.

F. CALENDAR

DAY	DATE	TIME	ACTIVITIES
1	Fri., Oct. 10	L.A./ S.S.	13-15 - Read in I.M.C. 16-17 - Learning Stations in Rooms 10 and 28
2	Tues., Oct. 14	L.A./ S.S.	16-17 - Read in I.M.C. 13-15 - Learning Station in Rooms 10 and 28
3	Wed., Oct. 15	L.A./ S.S.	13-15 Read in I.M.C. Then L.S. in 10 and 28
			16-17 L.S. in 10 and 28 Then read in I.M.C.
4	Thurs., Oct. 16	L.A./ S.S.	13-15 Read in I.M.C. Then L.S. in 10 and 28
			16-17 Read in I.M.C. Then L.S. in 10 and 28

DAY	DATE	TIME	ACTIVITIES	
5	Fri., Oct. 17	L.A./ S.S.	13-15	Read in I.M.C. Then L.S. in 10 and 28
			16-17	Read in I.M.C. Then L.S. in 10 and 28
6	Mon., Oct. 20	L.A./ S.S.	13-15	Read in I.M.C. Then L.S. in 10 and 28
			16-17	Read in I.M.C. Then L.S. in 10 and 28
7	Tues., Oct. 21	L.A./ S.S.	13-15	Read in I.M.C. Then L.S. in 10 and 28
			16-17	Read in I.M.C. Then L.S. in 10 and 28
8	Wed., Oct. 22	L.A./ S.S.	13-15	Complete Reading in I.M.C. Then complete L.S. in 10 and 28
			16-17	Complete L.S. in 10 and 28. Then complete readings in I.M.C.
9	Thurs., Oct. 23	L.A./ S.S.		Evaluation

G. Below are listed all of the stations and all levels at each station. Put a check next to each activity after it has been completed. This list is for your personal use so that you can keep an account of what you have completed and what you have left to do. Remember: the order in which you work on the stations does not matter as long as you complete the required stations.

Learning Station 1 (LS-1) - SPELLING

A _____

B _____

Learning Station 2 (LS-2) - TRIAL AND ERROR

A _____

Learning Station 3 (LS-3) - ASSOCIATIVE LEARNING SYSTEMS

A _____

Learning Station 4 (LS-4) - PROBLEM SOLVING

1 _____		7 _____
2 _____	5 _____	8 _____
3 _____	6 _____	9 _____

Learning Station 5 (LS-5) - MAZES

1 _____ OPTIONAL 3 _____

2 _____ 4 _____

5 _____

Learning Station 6 (LS-6) - NEWSPAPER

A _____

Learning Station 7 (LS-7) - CHARLIE'S WRITING

A _____

B _____

C _____

Learning Station 8 (LS-8) - OPTION

A _____

BECK MIDDLE SCHOOL
CHERRY HILL, N. J.

INTERDISCIPLINARY UNIT: OF MICE AND MEN

RELATED UNIT - GRAPHING

I. INTRODUCTION

In this unit related to our interdisciplinary unit "Of Mice and Men" we will learn how to organize many different types of data into an easily read and understood form - namely graphs.

II. LEARNING OBJECTIVES - Each student will demonstrate his/her ability to:

A. . . . set up a frequency distribution table.

B. . . . compute various types of averages using the mean, median and mode.

C. . . . graph given data in a bar graph and a line graph.

D. . . . use the material they have gathered about their mouse to perform exercises involving frequency distribution, averages and graphing.

E. . . . convert given measurements into the metric system.

III. ACTIVITIES

A. Frequency Distribution - Activity Sheet #1

B. Averages (Mean, Median, Mode) - Activity Sheet #2

C. Graphing Exercises - Activity Sheet #3

D. Correlation Exercises - Activity Sheet #4

E. Conversion Exercises - Activity Sheet #5 (Optional)

NAME _____

H.R. _____

INTERDISCIPLINARY UNIT - OF MICE AND MEN

RELATED UNIT: GRAPHING

DATA SHEET

GROUP 1-A

Student Number	Sex (M)	Sex (F)	Age (mos.)	Ht. (in.)	Wt. (lbs.)
1		X	145	64	105
2		X	159	65	135
3	X		158	62	96
4	X		165	62	95
5		X	165	61	105
6		X	160	65	113
7		X	162	62	110
8		X	162	65	105
9		X	159	64	96
10		X	159	65	105
11		X	163	66	103
12		X	168	62	98
13	X		167	64	113
14		X	165	62	105
15		X	161	68	119

GROUP 1-B

Student Number	Sex (M)	Sex (F)	Age (mos.)	Ht. (in.)	Wt. (lbs.)
1	X		151	59	90
2	X		159	65	100
3		X	159	60	130
4		X	156	61	88
5		X	161	60	96
6		X	161	61	105
7		X	151	62	94
8		X	163	65	105
9		X	168	65	100
10		X	155	60	94
11		X	161	60	88
12		X	165	68	129
13		X	159	62	106
14		X	160	59	97
15	X		169	59	32

GROUP 2-A

1		X	166	65	103
2	X		161	62	93
3		X	161	61	120
4		X	161	48	91
5	X		159	61	105
6		X	158	62	98
7	X		160	65	126
8	X		165	68	158
9	X		165	63	110
10	X		161	59	108
11		X	153	59	73
12		X	159	65	92
13		X	180	68	139
14					
15					

GROUP 2-B

1		X	163	65	105
2	X		160	64	110
3	X		160	62	100
4		X	165	62	95
5	X		165	63	95
6	X		158	60	90
7		X	168	62	119
8	X		162	66	125
9	X		164	60	85
10		X	159	68	118
11	X		164	63	105
12	X		167	65	130
13					
14					
15					

GROUP 3-A

Student Number	Sex (M)	Sex (F)	Age (mos.)	Ht. (in.)	Wt. (lbs.)
1	X		164	70	162
2	X		179	61	87
3	X		161	60	81
4		X	162	60	100
5	X		158	65	117
6	X		161	61	90
7	X		157	59	90
8	X		157	63	108
9	X		157	63	130
10	X		153	57	83
11		X	163	65	113
12	X		166	51	85
13		X	164	60	101
14	X		158	64	116
15	X		161	62	121

GROUP 3-B

Student Number	Sex (M)	Sex (F)	Age (mos.)	Ht. (in.)	Wt. (lbs.)
1		X	167	53	90
2		X	156	69	122
3	X		167	64	115
4	X		168	68	130
5	X		157	62	101
6		X	158	68	125
7	X		163	62	83
8		X	162	70	136
9		X	162	60	106
10	X		161	63	115
11					
12					
13					
14					
15					

GROUP 4-A

1	X		162	66	105
2		X	164	62	103
3	X		157	67	112
4		X	166	48	82
5		X	168	63	98
6	X		176	63	93
7	X		191	68	105
8		X	157	62	100
9	X		150	64	115
10	X		187	62	125
11	X		158	62	130
12	X		166	61	130
13	X		151	64	138
14		X	161	59	89
15					

GROUP 4-B

1	X		157	64	100
2	X		154	62	126
3	X		167	67	115
4	X		158	62	120
5	X		159	62	107
6	X		165	61	110
7	X		154	60	70
8		X	157	64	108
9		X	163	69	130
10	X		164	58	85
11		X	154	64	120
12					
13					
14					
15					

ACTIVITY SHEET #1

FREQUENCY DISTRIBUTION

1. Explanation and Examples

Suppose that we have been given a geography test yielding the scores shown below on Chart 1. To prepare a frequency table, the following steps are taken.

1. Step 1 - Determine the range. The range is defined as the highest score minus the lowest score plus one. The range in our example on chart 1 then is (82-28) + 1 = 55.

2. Step 2 - Determine the interval. A widely accepted practice is to have between 10 to 20 intervals in the frequency table. A common practice is to let the bottom interval begin with a number which is a multiple of the interval size.

3. Step 3 - Tally the scores. See example on chart 2.

4. Step 4 - Change tally marks into numbers. See example on chart 2.

5. Step 5 - Total the frequency column and record the number of cases at the bottom. This number must equal number of scores on tests.

CHART I

Scores on a Geography Test

56	62	52	62
28	38	54	54
42	57	62	42
56	55	68	48
47	56	42	53
78	47	39	60
82	37	44	42
55	72	47	50
56	65	52	48
41	66	48	68

CHART 2

Frequency Table

Intervals	Tallies	Frequency
81-83	1	1
78-80	1	1
75-77		0
72-74	1	1
69-71		0
66-68	111	3
63-65	1	1
60-62	1111	4
57-59	1	1
54-56	1111 111	8
51-53	111	3
48-50	1111	4
45-47	111	3
42-44	1111	5
39-41	11	2
36-38	11	2
33-35		0
30-32		0
27-29	1	1
	N =	40

2. Task: Complete the frequency table below for the ages of the members in your group. Use the example above as your guide in setting up the frequency table. (Let the youngest age be the midpoint of your bottom interval. Interval size should be 3.)

CHART

Interval	Tally	F Frequency

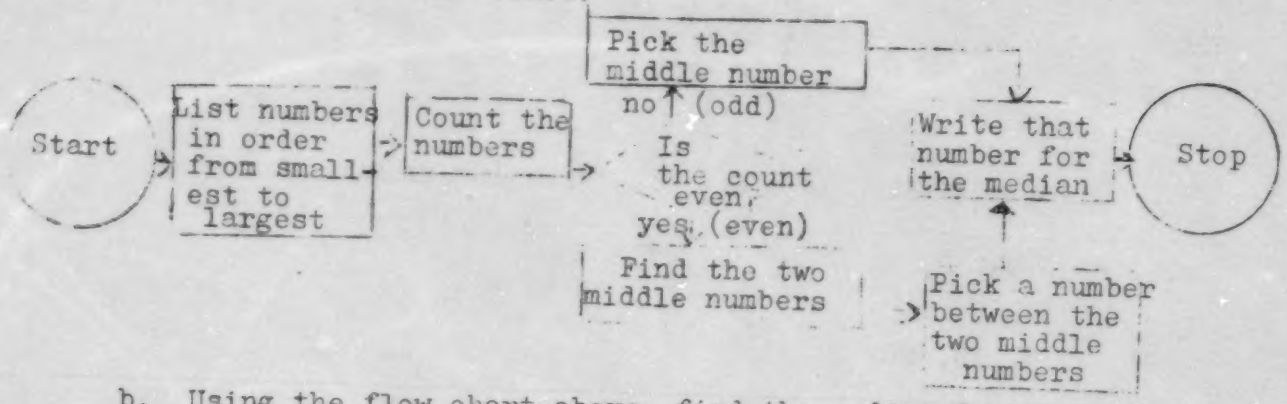
Range _____

ACTIVITY SHEET #2

AVERAGES

1. Median (Middle Number)

a. Look at the flow chart.


Start
List numbers in order from smallest to largest
Count the numbers
Is the count even, yes (even) no (odd)
Find the two middle numbers
Pick a number between the two middle numbers
Pick the middle number
Write that number for the median
Stop

b. Using the flow chart above, find the median for the numbers.

	Numbers	List in order	Median
x1)	6, 0, 5, 3, 8	0, 3, 5, 6, 8, ___, ___	5
x2)	4, 9, 7, 6	4, 6, 7, 9	6½
3)	8, 7, 0, 5, 7, 4, 6	___, ___, ___, ___, ___, ___, ___	
4)	8, 9, 6, 7, 5, 6, 7	___, ___, ___, ___, ___, ___, ___	
5)	3, 2, 1, 7, 4, 1	___, ___, ___, ___, ___, ___	
6)	4, 9, 4, 3, 7, 2	___, ___, ___, ___, ___, ___	
7)	7, 18, 9, 4, 6, 8, 7	___, ___, ___, ___, ___, ___, ___	
8)	6, 7, 4	___, ___, ___	

2. Mode - Number that occurs most often

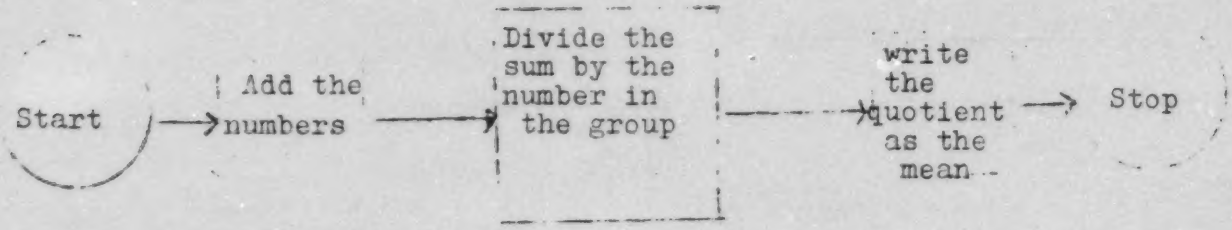
a. If two or more numbers tie for the mode, each of these numbers is a mode. (See example #1)
If each number is different, each number is a mode. (See example #2)

b. Find the modes

	Numbers	List in order	Mode
x1)	4, 5, 3, 4, 0	0, 3, 4, 4, 5	4
2)	8, 3, 6, 7, 8, 3	3, 3, 6, 7, 8, 8, 3	8
3)	8, 7, 9, 8, 6, 5	___, ___, ___, ___, ___, ___	
4)	7, 6, 8, 3, 1, 2, 3, 7	___, ___, ___, ___, ___, ___, ___	
5)	9, 5, 7, 4, 8	___, ___, ___, ___, ___	
6)	6, 2, 8, 1, 1, 7, 8	___, ___, ___, ___, ___, ___, ___	
7)	5, 6, 4, 16, 5, 4, 16	___, ___, ___, ___, ___, ___, ___	

3. Mean - Average

a. This flow chart tells how to find the mean of a group of numbers.



b. Task: Find the mean for the following groups of numbers

Ex.1) 29, 35, 8, 2 total 74 divided by 4 = $18\frac{1}{2}$

2) 6, 9, 15, 20, 7 _____

3) 8, 9, 6, 5, 14, 3, 2 _____

4) 54, 36, 9, 75 _____

5) 46, 78, 15, 178, 5, 14 _____

4. Exercise

a. Task: Find the following for your group.

	Age	Height (in.)	Weight (lb.)
Median	_____	_____	_____
Mode	_____	_____	_____
Mean	_____	_____	_____

Find the mean age, height, and weight of all the males on the team. (See the data sheet.)

Age _____ Height _____ Weight _____

Find the mean age, height and weight of all the females on the team. (See the data sheet.)

Age _____ Height _____ Weight _____

ACTIVITY SHEET #3

GRAPHING EXERCISES

DIRECTIONS: Use the Data Sheet to complete these exercises. Use graph paper given to you for all graphs.

1. Make a bar graph for the heights of the members in your group

   Verticle Axis - Frequencies
   Horizontal Axis - Heights in inches

2. Make a line graph for the mean heights and weights of all eight (8) groups.

   Verticle Axis - Weights
   Horizontal Axis - Heights

ACTIVITY SHEET #4

CORRELATION EXERCISES

DIRECTIONS: Use the data on your Daily Measurement Log to complete the following exercises. Task 4 and 5 should be completed on the graph paper given to you in class.

1. Task: Calculate ranges for the following:

   Body length of mouse _____

   Body weight of mouse _____

   Water consumption _____

   Food consumption _____

2. Task: Set up frequency distributions. (Use appropriate intervals.)

   1. Water consumption
   2. Food consumption

3. Task: Find the mean of the following:

   Body length growth of mouse _____

   Body weight growth of mouse _____

   Water consumption _____

   Food consumption _____

4. Task: Make a bar graph

   Verticle Axis - Frequency

   Horizontal Axis - Water Consumption

5. Task: Make a line graph

   Verticle Axis - Frequency

   Horizontal Axis - Food Consumption

ACTIVITY SHEET #5

OPTIONAL CONVERSION EXERCISE

1. Task: Complete the frequency table for the weights of the members in your group. Make the necessary conversions using the following proportion, prior to setting up the intervals. (Interval size should be 5 kilograms. Make the lowest weight the midpoint of the bottom interval.)

$$\frac{2.20\ (\text{lb})}{1\ (\text{kgm})} = \frac{\text{weight (lbs)}}{\text{weight (kgm)}}$$

* Round to the nearest unit.

Weight	
lbs.	kgms

Interval	Tally	f

2. Task: Complete the frequency table for the heights of the members in your group. Make the necessary conversions using the following proportion. (Interval size should be 1 starting with the lowest height.)

$$\frac{2.54\ (cm)}{1\ (in)} = \frac{height\ (cm)}{height\ (in)}$$

Ex: $\frac{2.54\ (cm)}{1\ (in)} = \frac{h\ (cm)}{63\ (in)}$

$1h = 2.54 \times 63$

$h = 160.02$

* Round cm to the nearest unit (160.02 cm = 160 cm)

Range _____ _____
in cm

Height (inches)	Height (centimeters)	Tally	f